

**United States Patent** [19]  
**Freeman**

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[54] **MULTIFOCAL CONTACT LENSES  
UTILIZING DIFFRACTION AND  
REFRACTION**

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G02B 3/08; G02B 27/44**

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350/162.22; 350/452; 351/177**

[58] **Field of Search** ..... **350/162.22, 452, 162.16;  
351/160 R, 160 H, 161, 162, 177**

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[57] **ABSTRACT**

A bifocal contact lens has diffractive power added to the basic refractive power provided by the material of the lens and the basic curvature of its front and rear surfaces. The diffractive power arises from concentric zones, each providing an asymmetric retardation of light across the zone width to direct design wavelength light predominantly into a required order and sign of diffraction, while other wavelength light is predominantly transmitted at zero order. Design wavelength light from an object at one distance can then be focused by way of diffraction of that order and sign, and other wavelength light from an object at another distance can be focused by way of zero order transmission. Preferably the zones are defined, and the asymmetric retardation provided, by a rear surface contour having steps but which approximates to the required basic curvature.

**22 Claims, 11 Drawing Figures**

